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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,687	07/28/2003	Toshikazu Kanaoka	0941.68224	7113

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EXAMINER
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GUPTA, PARUL H

ART UNIT	PAPER NUMBER
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2627

DATE MAILED: 11/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/628,687

Applicant(s)

KANAOKA ET AL.

Examiner

Parul Gupta

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-11 and 15-17 is/are rejected.
- 7) ☐ Claim(s) 8 and 12-14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. Claims 1-17 are pending for examination as interpreted by the examiner. The arguments filed on 8/28/06 were considered.

#### ***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Dogliotti et al., US Patent 4,121,165.

Dogliotti et al. teaches a data reproduction device for sampling an analog signal reproduced from a recording medium based on a synchronization clock signal synchronized with the reproduced signal (done by "UCE" of figure 1), the data reproduction device comprising: an analog-to-digital (A/D) conversion part (shown in figure 2) that converts the reproduced signal into a first digital signal based on a first clock signal (CK1); an interpolation part (element UIN of figure 2) that interpolates the first digital signal so that the first digital signal is equalized with a second digital signal sampled based on a second clock signal (CK2 and CK3) having a frequency  $n$  times a frequency of the first clock signal (column 3, lines 29-37), the interpolation part providing an output based on the interpolation (X and Y of figure 1); an optimum phase detection part that is supplied with the output of said interpolation part and, based on the output, detects a phase error between an optimum point of the reproduced signal and the synchronization clock signal (done by "phase corrector" of figure 1); a phase correction part that corrects a phase of the reproduced signal based on the phase error (shown in

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figure 1); and an information data start detection part that detects a start of information data based on the phase error (column 3, lines 64-68).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dogliotti et al., US Patent 4,121,165 in view of Lee, US Patent 6,055,119.

Regarding claim 2, Dogliotti et al. teaches the data reproduction device including all of the limitations of claims 2-5 (see rejection of claim 1) except for the limitations further recited in claims 2-5.

Lee teaches the further limitations of claim 2 of a device wherein a recording medium has recording tracks (shown in figure 5A) each having a phase detection region and an information data start detection region (functions of both are performed by the pre-amble area of figure 5A) to which regions a predetermined pattern is written (explained in column 5, lines 34-36), and wherein the optimum phase detection part of the data reproduction device detects a phase error between an optimum point of the predetermined pattern and the synchronization clock signal (column 8, lines 19-33).

Regarding claim 3, Lee teaches the further limitations of the data reproduction device as claimed in claim 2, wherein a predetermined dedicated pattern is recorded in the phase detection region and the information data start detection region (column 5, lines 34-36).

Regarding claim 4, Lee teaches the further limitations of the data reproduction device as claimed in claim 2, wherein the phase detection region and the information data start detection region comprise a single region (both functions performed by the pre-amble area as explained in column 8, lines 19-33).

Regarding claim 5, Lee teaches the further limitations of the data reproduction device as claimed in claim 2, wherein the predetermined pattern differs between adjacent recording tracks (column 4, lines 58-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the concept of the given recording tracks as taught by Lee into the system of Dogliotti et al. This would to provide a circuit for adaptively processing symbol timing recovery and equalization using known signal sequence (column 3, lines 15-18) of Lee.

4. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dogliotti et al., US Patent 4,121,165 in view of Tajiri et al., US Patent 5,946,359.

Dogliotti et al. teaches the data reproduction device including all of the limitations of claims 6 and 7 (see rejection of claim 1) except for the limitations further recited in claims 6 and 7.

Regarding claim 6, Tajiri et al. teaches the further limitations of the data reproduction device wherein said interpolation part is an interpolation digital filter having coefficients substantially equal to an impulse response of a transmission characteristic of a signal recording and reproduction channel for the recording medium (column 5, lines 19-25).

Regarding claim 7, Tajiri et al. teaches the further limitations of the data reproduction device wherein said interpolation part comprises a plurality of FIR filters (given in column 5, lines 19-25) arranged in parallel (shown in figure 11), the FIR filters each having a different set of coefficients (given in column 14, lines 19-23).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the concept of the given filters as taught by Tajiri et al. into the system of Dogliotti et al. This would serve to provide a measuring apparatus which enables a data demodulation (or data detection) and an estimation of transmission parameters for a modulation signal from a digital equipment (column 3, lines 13-17 of Tajiri et al.)

5. Claims 9, 10, 11, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dogliotti et al., US Patent 4,121,165 in view of Tajiri et al., US Patent 5,946,359 in view of Lee, US Patent 6,055,119.

Dogliotti et al. teaches the data reproduction device including all of the limitations of claims 9, 10, 11, 15, and 16 (see rejection of claim 1) except for the limitations further recited in claims 9, 10, 11, 15, and 16.

Regarding claim 9, Dogliotti et al. teaches the further limitations of the data reproduction device wherein: said A/D conversion part converts the reproduced predetermined analog pattern into a first digital pattern (shown in figure 2) based on the first clock signal (CK1); said interpolation part (element UIN of figure 2) interpolates the first digital pattern so that the first digital pattern is equalized with a second digital pattern sampled based on the second clock signal (CK2 and CK3) having the frequency  $n$  times the frequency of the first clock signal (column 3, lines 29-37).

Dogliotti et al. does not but Tajiri et al. teaches said optimum phase detection part detects the optimum phase by performing a cross-correlation operation (shown in figure 8) between the interpolated digital pattern and data obtained by weighting the predetermined pattern, which is to be written to the phase detection region and the information data start detection region of the recording medium, with coefficients substantially equal to an impulse response of a transmission characteristic of a signal recording and reproduction channel for the recording medium (column 5, lines 19-25).

Dogliotti et al. in view of Tajiri et al. does not but Lee teaches that the recording medium has recording tracks (shown in figure 5A) each having a phase detection region and an information data start detection region (functions of both are performed by the pre-amble area of figure 5A) to which regions a predetermined pattern is written (explained in column 5, lines 34-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the concept of the given optimum phase detection part as taught by Tajiri et al. into the system of Dogliotti et al. This would serve to provide a measuring

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apparatus which enables a data demodulation (or data detection) and an estimation of transmission parameters for a modulation signal from a digital equipment (column 3, lines 13-17 of Tajiri et al.). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the concept of the given recording tracks as taught by Lee into the system of Dogliotti et al. in view of Tajiri et al. This would to provide a circuit for adaptively processing symbol timing recovery and equalization using known signal sequence (column 3, lines 15-18) of Lee.

Regarding claim 10, Tajiri et al. teaches the further limitations of the data reproduction device wherein said optimum phase detection part comprises a cross-correlation part that performs the cross-correlation operation in parallel (shown in figure 8).

Regarding claim 11, Tajiri et al. teaches the further limitations of the data reproduction device wherein said optimum phase detection part comprises an optimum phase comparison and selection part (element 122 of figure 8), the optimum phase comparison and selection part comprising: a storage part (elements 156 and 157 of figure 10) storing a maximum cross-correlation value, an optimum interpolation signal number (output from element 24 of figure 5), and an optimum phase position (referred to as "correct carrier phase" and "correct clock phase" in column 9, lines 31-34); and a comparison part that compares a new cross-correlation value obtained by the cross-correlation operation with the maximum cross-correlation value, and replaces the maximum cross-correlation value, the optimum interpolation signal number, and the



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optimum phase position stored in said storage part with the new cross-correlation value, and a new optimum interpolation signal number and a new optimum phase position corresponding to the new cross-correlation value, respectively, if the new cross-correlation value is larger than the maximum cross-correlation value. Figure 7 shows how these calculated values are initial value estimates that are then fine corrected based on further calculations.

Regarding claim 15, Tajiri et al. teaches the further limitations of the data reproduction device wherein: said phase correction part (element 122 of figure 8) comprises a selector that corrects the phase of the reproduced signal by selecting an interpolation signal interpolated by said interpolation part in accordance with the stored or new optimum interpolation signal number output from said optimum phase detection part; and said information data start detection part comprises: an optimum phase output counter that detects the start of the information data out of the selected interpolation signal based on the stored or new optimum phase position output from said optimum phase detection part (it would be obvious to use the stored or new data to detect information); and a signal selection part that re-samples the selected interpolation signal into a signal synchronized with the synchronization clock signal (explained in column 22, lines 14-20).

Regarding claim 16, Tajiri et al. teaches the further limitations of the data reproduction device as claimed in claim 15, wherein: said optimum phase output counter outputs only portion of the selected interpolation signal which part corresponds to the information data; and said signal selection part re-samples the output portion of

the selected interpolation signal so that the re-sampled output portion synchronizes with the synchronization clock signal (explained in column 22, lines 14-20).

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dogliotti et al., US Patent 4,121,165 in view of Kimoto et al., US Patent 4,519,056.

Regarding claim 17, Dogliotti et al. teaches a data reproduction apparatus (shown in figure 1), comprising: a data reproduction device as set forth in claim 1.

Dogliotti et al. does not but Kimoto et al. teaches an optical head (element 3 of figure 1A) that emits light to the recording medium (from the laser diode of element 4 of figure 1A) and converts light reflected therefrom into an electrical signal (done by photodiode of element 10 of figure 1A as explained in column 3, lines 48-49); an AGC and equalizer part that is supplied with the electrical signal output from said optical head and outputs the analog signal to said data reproduction device (performed by "digitizer" of element 19 of figure 1B); and a demodulator (element 20 of figure 1B) that demodulates an output of said data reproduction device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the concept of the optical head using the data reproduction device as taught by Kimoto et al. into the system of Dogliotti et al. This would provide a data recording apparatus which allows continuous recording even if a recording error such as overlay recording or a tracking error occurs (column 1, lines 58-61 of Kimoto et al.).

***Allowable Subject Matter***

7. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base

claim and any intervening claims. The claim would be allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose the clause of the claims that refers to the given interpolation method.

Claims 12-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The claims would be allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose the clause of the claims that refers to the given comparison gate.

### ***Response to Arguments***

8. Applicant's arguments filed 8/28/06 have been fully considered but they are not persuasive.

Regarding applicant's statement that the phase detector CJ is different from the present invention because it does not detect a phase error between an optimum point of the reproduced signal and the synchronization clock signal, the examiner disagrees. Dogliotti explains in column 4, lines 41-44 how tau (the phase error) is obtained. It is created based on the signal from the synchronization estimator and the equalized baseband signal. This is the same as the optimized reproduce signal and the synchronization clock signal. As the reference includes the error signal of tau as the phase error signal of these two signals, this is inevitably the optimum point.

Regarding applicant's statement that the phase detector CJ is different from the present invention because it does not correct a phase of the reproduce signal using a phase error that is determined based on an optimum point of the reproduce signal, the

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examiner disagrees. Dogliotti explains in column 4, lines 41-44 how tau (the phase error to be corrected) is obtained. It is created based on the signal from the synchronization estimator and the equalized baseband signal. This is the same as the optimized reproduce signal and the synchronization clock signal. As the reference includes the error signal of tau as the phase error signal of these two signals, this is inevitably the optimum point.

Regarding applicant's statement that the information data start detection part that detects a start of information based on the phase error detected by the optimum phase detection part, the examiner disagrees. Column 3, lines 64-68 yield the detection of the start of information data. Dogliotti explains in column 4, lines 41-44 how tau (the phase error to be corrected) is obtained. It is created based on the signal from the synchronization estimator and the equalized baseband signal. This is the same as the optimized reproduce signal and the synchronization clock signal. Thus, as this is used to establish an optimum time position corresponding to the start of information data, the same signals are used.

Regarding applicant's statement that the method of sampling in Dogliotti is different because it has a feedback configuration instead of a feed forward configuration without a loop, the examiner disagrees. Dogliotti explains in column 3, lines 56-64 the sampling method that involves sampling, then interpolating, then phase correcting. This is the same order of steps as given in the present invention.

Regarding applicant's statement that the timing signals CK2 and CK3 have a lower frequency ( $p/q$ ) than the timing signal CK1 and are thus not  $n$  times a frequency of

the first clock signal, the examiner disagrees. This issue of higher and lower frequencies is never claimed. Column 3, lines 28-37 of Dogliotti yield the same difference of frequencies. Column 6, lines 14-20 of Dogliotti yield the ratio of  $p/q$  to represent  $n$ .

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

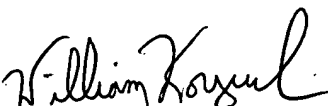
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parul Gupta whose telephone number is 571-272-5260. The examiner can normally be reached on Monday through Thursday, from 8:30 AM to 7 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Korzuch can be reached on 571-272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PHG  
11/27/06

  
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